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- Sea scallop deployment and retrieval

Outreach Efforts
- Shellfish Stewards flyers
- Press
- Market Square Day acceptance letter and photos

Shellfish advisory board

AERC board member list

Online shellfish reference list

Shellfish Stewards Manual and Training Checklist

New Hampshire
Fish and Game Department

2 Hazen Drive, Concord, NH 03301-6500
Headquarters: (603) 271-3421
Web site: www.wildlife.state.nh.us

TDD Access: Relay NH 1-800-735-2964
FAX (603) 271-1438
E-mail: info@wildlife.state.nh.us

William S. Bartlett, Jr.
Acting Executive Director

Daniel R. Lynch
Assistant Director

January 16, 2003

TO WHOM IT MAY CONCERN:

Under the authority contained in RSA 214:29, permission is hereby granted to **Dyanna L. Smith, Executive Director, Aquaculture Education and Research Center, Hampton, N.H.**, to collect and possess for educational purposes, species of finfish and invertebrates found in New Hampshire coastal waters.

This permit is subject to the following conditions:

1. The permitted species may be collected by use of hand-held nets or minnow traps.
2. The collected specimens shall be maintained in a closed-system aquarium at the Aquaculture Education and Research Center's laboratory in Hampton, New Hampshire.
3. Any species of finfish and invertebrates captured that are not or cannot be retained, shall be released at the point of capture.
4. No lobsters or commercially valuable crab species may be taken by the permittee.
5. Sea scallop (*Placopecten magellanicus*) seed may be possessed and planted in the coastal waters. The source of scallop seed shall be Mr. Marston Brewer of Stonington, Maine. These seed are recruited from Gulf of Maine broodstock. An Importation Permit must be acquired from New Hampshire Fish & Game Department Law Enforcement Division prior to the importation of the scallop seed.
6. Sub-permittees Mark Rosenqvist, Neil Savage and Norman Brandt, may assist in the collection and maintenance of specimens covered by this permit.
7. There shall be no release of aquarium fish used in this project.

The permittee shall furnish the Executive Director, by January 31, 2004, a written report containing the approximate number and species taken and possessed and the disposition of any possessed species.

This permit shall expire December 31, 2003, unless sooner revoked or rescinded. No collections may be made after December 31, 2003, without renewal of this permit.

William S. Bartlett

William S. Bartlett, Jr.
Acting Executive Director

cc: Marine Fisheries Division
Law Enforcement
Lt. Edmond Cournoyer
Sgt. Robert Babula

New Hampshire
Fish and Game Department

11 Hazen Drive, Concord, NH 03301-6500
Headquarters: (603) 271-3421
Web site: www.wildlife.state.nh.us

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FAX (603) 271-1438
E-mail: info@wildlife.state.nh.us

Lee E. Perry
Executive Director

Daniel R. Lynch
Assistant Director

March 23, 2004

TO WHOM IT MAY CONCERN:

Under the authority contained in RSA 214:29, permission is hereby granted to **Neil Savage, Research Coordinator, Aquaculture Education and Research Center, Hampton, N.H.**, to collect and possess for educational purposes, species of finfish and invertebrates found in New Hampshire coastal waters.

This permit is subject to the following conditions:

1. The permitted species may be collected by use of hand-held nets or minnow traps.
2. The collected specimens shall be maintained in a closed-system aquarium at the Aquaculture Education and Research Center's laboratory in Hampton, New Hampshire.
3. Any species of finfish and invertebrates captured that are not or cannot be retained, shall be released at the point of capture.
4. No lobsters or commercially valuable crab species may be taken by the permittee.
5. Sea scallop (*Placopecten magellanicus*) seed may be possessed and planted in the coastal waters. The source of scallop seed shall be Mr. Marston Brewer of Stonington, Maine. These seed are recruited from Gulf of Maine broodstock. An Importation Permit must be acquired from New Hampshire Fish & Game Department Law Enforcement Division prior to the importation of the scallop seed.
6. Sub-permittees Mark Rosenqvist, Stanley Sinitsky and Norman Brandt, may assist in the collection and maintenance of specimens covered by this permit.
7. There shall be no release of aquarium fish used in this project.

The permittee shall furnish the Executive Director, by January 31, 2005, a written report containing the approximate number and species taken and possessed and the disposition of any possessed species.

This permit shall expire December 31, 2004, unless sooner revoked or rescinded. No collections may be made after December 31, 2004, without renewal of this permit.

Lee E. Perry
Executive Director

cc: Marine Fisheries Division
Law Enforcement
Lt. Edmond Cournoyer
Sgt. Jeffrey Marston

AERC

5 May 2003

Mr. Bruce Smith
New Hampshire Fish and Game Dept.
Region 3, Marine Div.
Durham NH

Dear Bruce,

In accordance with our scientfic permit, we hereby request written permission to transfer seed sea scallops, Placopecten magellanicus, from Saco ME to Hampton NH. The seed scallops will be enclosed in 20-25 "spat bags" [collectors] containing a total of up to several thousand scallop spat, the largest measuring about 3 mm shell width. The spat are expected to be ready for shipment this week. Our contact for this transfer is Rosanne Mizzoni, Northwest Atlantic Marine Alliance, tel. 207-284-5374.

We plan to grow out these spat in natural seawater until they reach roughly 11-15 mm shell width, whereupon we expect lobstermen volunteers to disperse the survivors onto the sea bottom within New Hampshire state coastal waters.

If you would, please fax your written response to this request as soon as possible to the following Fax number: 603-926-5278

Respectfully,

Neil B. Savage

Neil Savage, Research Coordinator
Aquaculture Education & Research Center
Hampton NH 03842

Aquaculture Education and Research Center
P.O. Box 1624 • Hampton, NH 03843-1624 • phone:603/926-1650 • fax:603/926-5278
www.teachfish.org

New Hampshire
Fish and Game Department

2 Hazen Drive, Concord, NH 03301-6500
Headquarters: (603) 271-3421
Web site: www.wildlife.state.nh.us

TDD Access: Relay NH 1-800-735-2964
FAX (603) 271-1438
E-mail: info@wildlife.state.nh.us

William S. Bartlett, Jr.
Acting Executive
Director

Daniel R. Lynch
Assistant Director

Permit No. 2003 -15

PERMIT TO IMPORT WILDLIFE OR FISH

UNDER THE AUTHORITY CONTAINED UNDER RSA 207:14, PERMISSION IS HEREBY GRANTED TO:

Dyanna Smith and Dr. Neil Savage, Aquaculture Education and Research Center, P O Box 1624, Hampton, New Hampshire 03843-1624

To Import: **Sea Scallops (approximately 60,000 seed)**

Species to be imported under this permit are from:

Craig Pendleton and Rosanne Mizzoni
Northwest Atlantic Marine Alliance (NAMA)
200 Maine Street, Suite A
Saco, Maine 04072

Conditions of the Permit

1. Any species imported into the state shall be imported in compliance with all applicable State and Federal laws or rules, such as the NH Dept. of Agriculture, US Dept. Of Agriculture, or the US Fish and Wildlife Service.
2. Persons importing wildlife, including fish, pursuant to the requirements of Fis 803, shall notify the department prior to the importation into the state.
3. Exhibitors importing wildlife meeting the USDA health certification requirements shall notify the department within five days after the importation.
4. This permit issued in conjunction with the **AERC** Scientific Permit issued January 16, 2003
5. **This permit expires December 31, 2003**

_____
Permittee Signature

William S. Bartlett, Jr.
Acting Executive Director

June 16, 2003
Date of Issue

cc: Director's Office
Lt. Cournoyer
Marine Fisheries Division
File

Conserving New Hampshire's wildlife and their habitats since 1865.

STATE OF MAINE
DEPARTMENT OF
MARINE RESOURCES
MARINE RESOURCES LABORATORY
P.O. BOX 8, 194 McKOWN POINT RD
W. BOOTHBAY HARBOR, MAINE 04575-0008

JOHN ELIAS BALDACCI
GOVERNOR

GEORGE D. LAPOINTE
COMMISSIONER

June 9, 2003

SPECIAL LICENSE NUMBER ME 2003-64-02
Amendment #1

Acting under the authority vested in the Commissioner of Marine Resources by virtue of 12 M.R.S.A. §6074, I hereby renew a Special License to **ROSANNE MIZZONI**, Administrative Coordinator and **CRAIG A. PENDLETON**, Coordinating Director of the Northwest Atlantic Marine Alliance (NAMA) and Coordinator for the Scallop Stock Enhancement Project in Saco Bay, 200 Main Street, Suite A, Saco, Maine 04072. This Special License (SL) exempts ROSANNE MIZZONI and CRAIG A. PENDLETON in the course of conducting scallop research and educational activities from Marine Resources laws and regulations pertaining to the taking, possession, shipping and transportation of scallops less than legal size, regulation Chapter 11.10(B), and out of season as per 12 M.R.S.A. §6722.
This Special License is issued subject to the following conditions:

1. **Who:** Craig A. Pendleton and Rosanne Mizzoni and additional persons under this SL include:

2. **What/How:** Collection of scallop spat using spat collection gear (spat bags (small mesh), a buoyed vertical line and anchor) and growout.

3. **Where:** Saco Bay

4. **When:** Year-round. Restarted in May 2003.

   - **What/Who/When/Where:** 11 strings of undersize scallop seed collected, under SL 2002-80-01 and 2003-65-02, shall be transported by **Craig Pendleton or Rosaane Mizzoni** during the month of **June** from **Stonington to Saco or Camp Ellis**, Maine. Ten of the 11 scallop seed strings will then be transferred aboard a vessel to Saco Bay and separately (1 of 11 strings) will be delivered to **Dr. Neil Savage** of the Aquaculture Education and Research Center (AERC)/New Hampshire Marine Alliance and NAMA member, and transported to **Hampton, New Hampshire** for their scallop enhancement program. **Marine Patrol** shall be notified prior to this transport and transfer and provided additional details that they may require, see contact information below.

5. **Conditions:**

   - The use of seed produced in the project shall be used for **stock enhancement purposes only**. The use of seed produced in the project is expressly **prohibited from use in aquaculture leases** issued by the Department.

   - **No sale** of any seed collected is allowed.

   - Marine Patrol Division II office (east of Port Clyde), Tel: 667-3373, or **Marine Patrol Division I office (west of Port Clyde), Tel: 633-9595, shall be notified prior to** the start up of activities in 2003 to make arrangements as to the frequency to contact Marine Patrol to provide the Special License (SL) number, date(s) and location(s) of collection/monitoring activities, names of all person(s) to be in the field that are listed on the SL per date, the name(s) of person(s) that may ***transfer or transport*** scallops under this SL and the names of vessels utilized for transfer.

PHONE: (207) 633-9500 http://www.Maine.gov/dmr FAX: (207) 633-9579

Page 2 of 2, June 9, 2003SL #ME 2003-64-02 Amendment #1 continued:

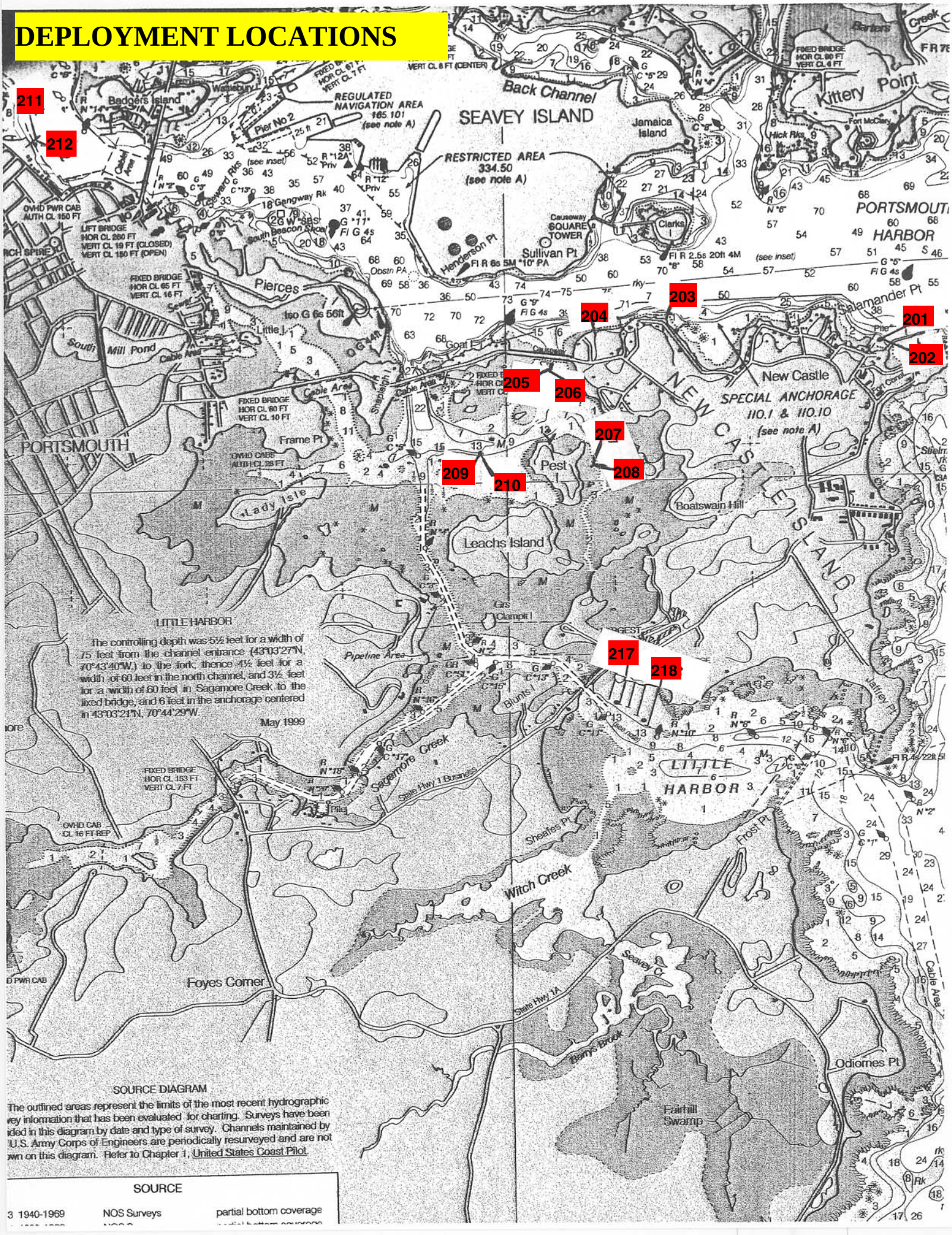
- **Failure to contact Marine Patrol shall be grounds for the immediate revocation.** Research and Marine Patrol personnel of the Department of Marine Resources shall have access to all biological data, records and research aspects of the operation or facilities.
- Any gear utilized must be rigged to **conform to whale take reduction protocols.** Each surface buoy must be marked with **"ME 2003-64-02"**, a contact name and phone number. The NAMA buoy color(s) will be confirmed with Marine Patrol.
- A **report** on the research status or results shall be provided to the Department at the end of the year, conclusion of the research, and prior to renewal, which summarizes the activities, identifies the locations used and the data collected.
- Additional conditions may be added at the discretion of the Commissioner.
- Any infraction of these conditions or related Marine Resources laws shall be grounds for the immediate revocation of this Special License.

This Special License ***expires on December 31, 2003*** and has 2 remaining renewals.

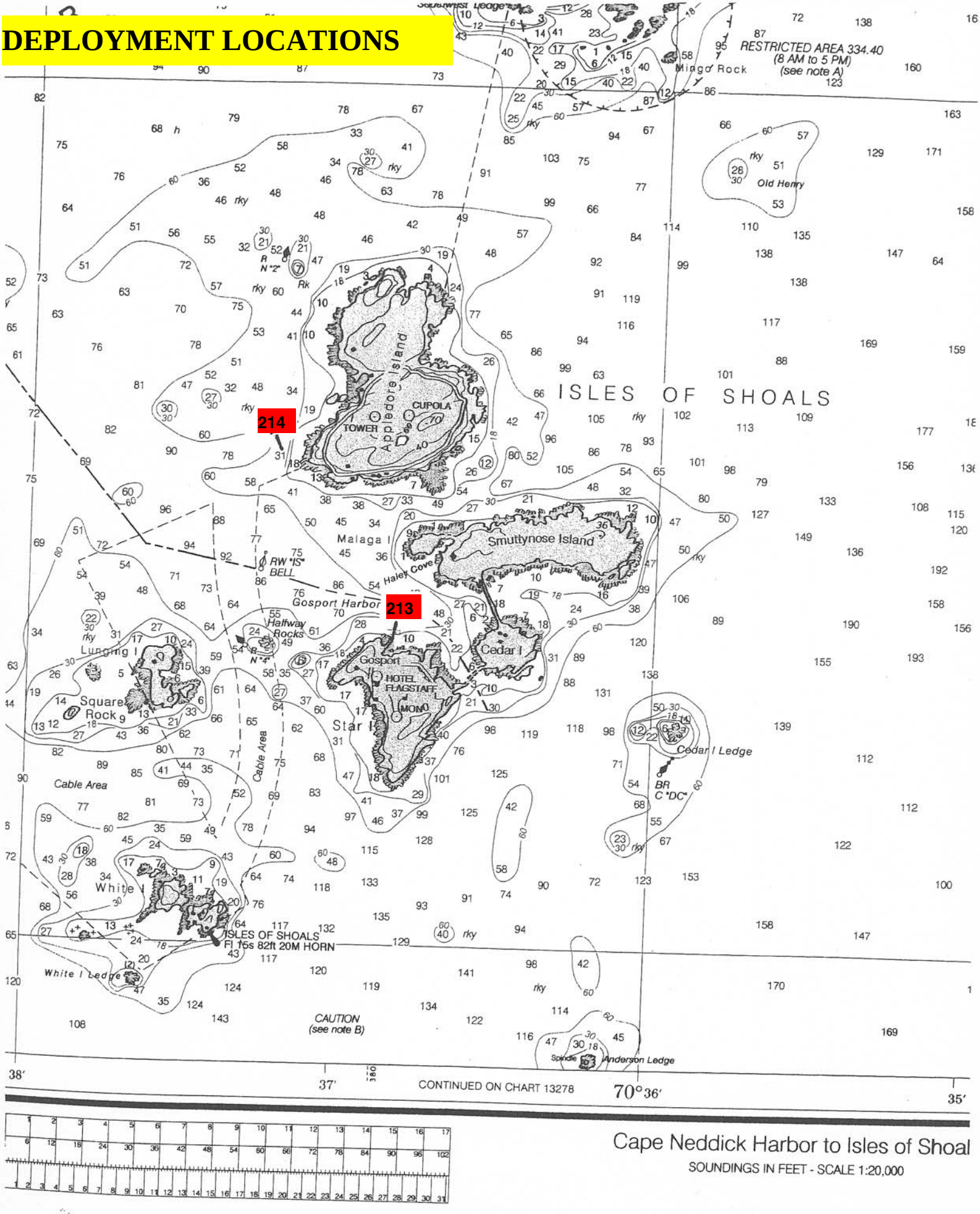
GEORGE D. LAPOINTE
Commissioner

cc: Marine Patrol Division I & II
MPO Thomas Hale, PO Box 7199, Scarborough, Maine 04070
Feindel, Scott
Schick, Dan
Stockwell, Terry
Waterstrat, Paul

DEPLOYMENT LOCATIONS



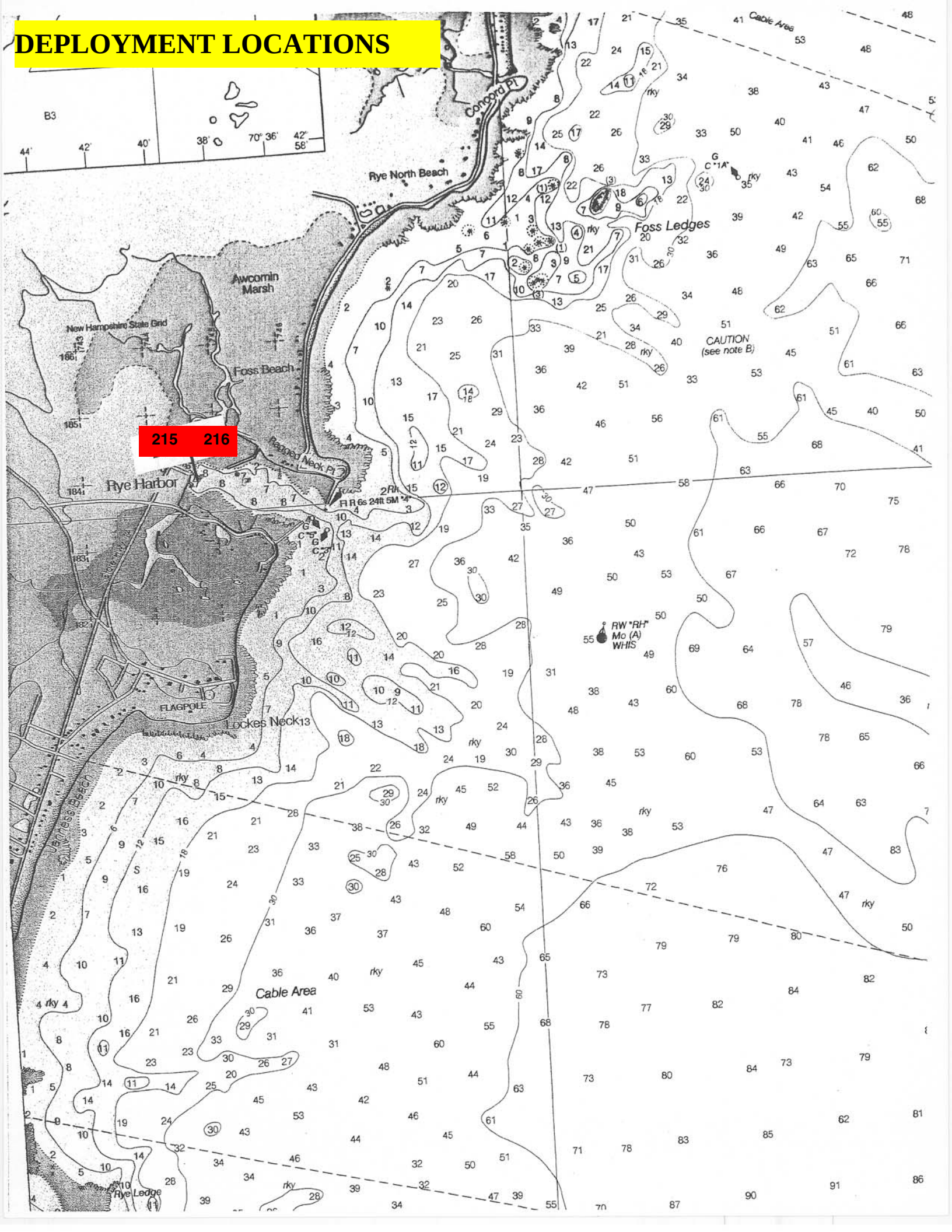
DEPLOYMENT LOCATIONS



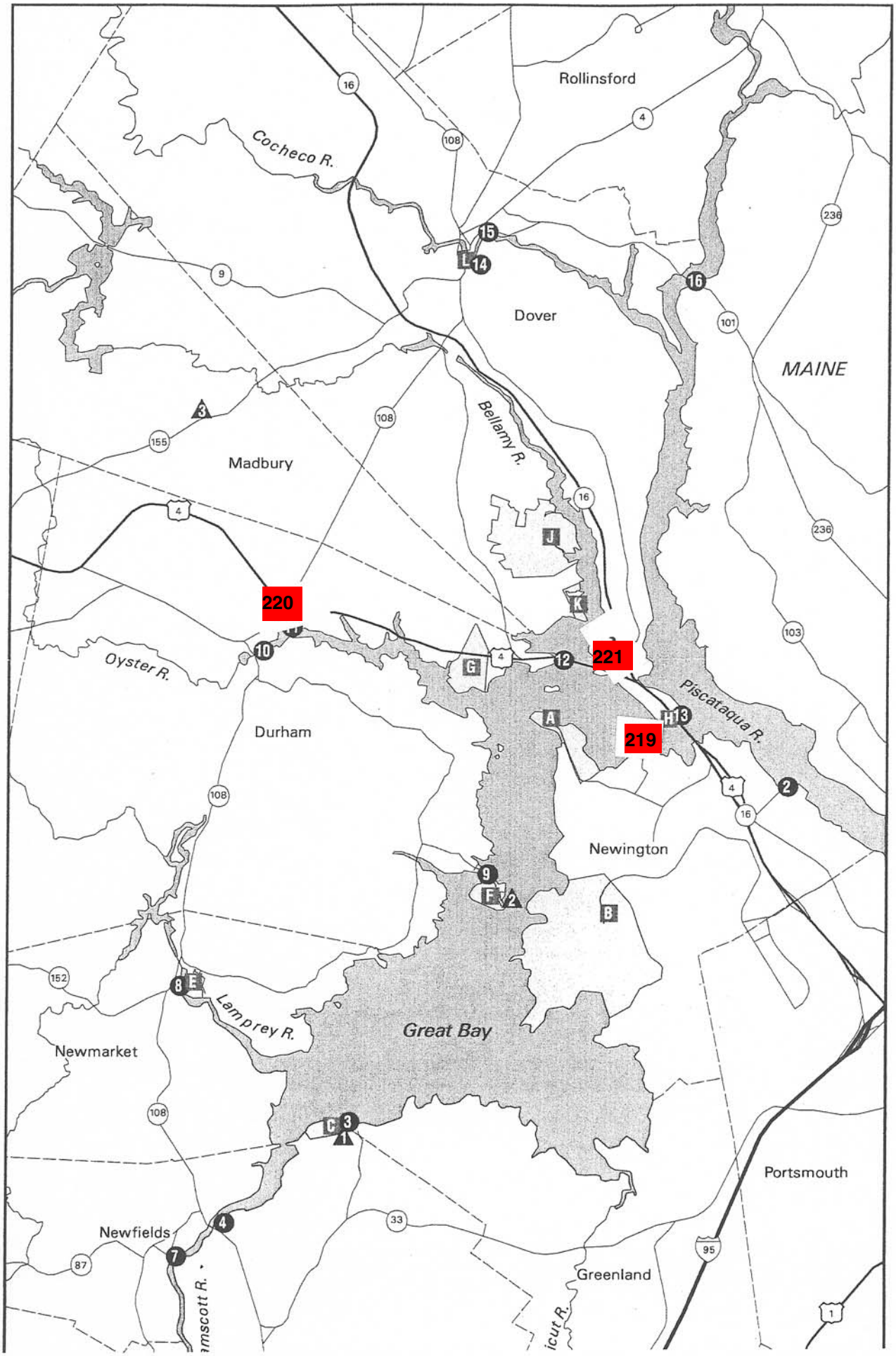
Cape Neddick Harbor to Isles of Shoal

SOUNDINGS IN FEET - SCALE 1:20,000

DEPLOYMENT LOCATIONS



DEPLOYMENT LOCATIONS



Oyster Spat Collector Deployment Photos

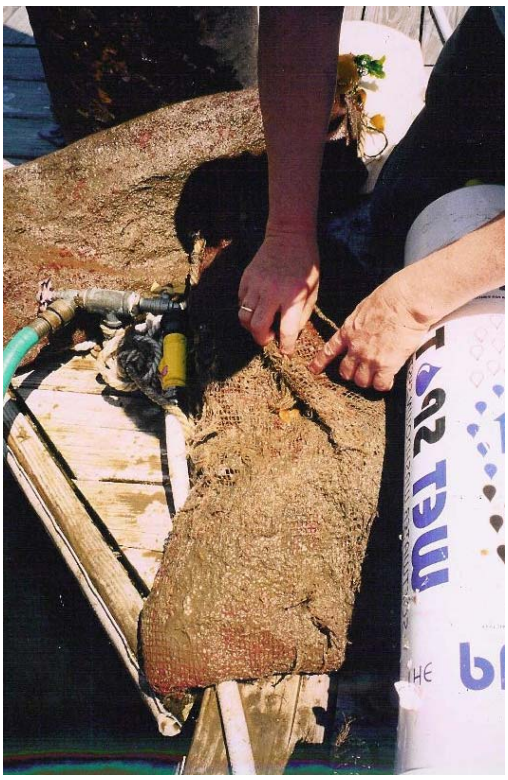
Above: Dyanna Smith with oyster spat collectors ready for deployment.
Below left: One dock site used for deployment
Below center: The top end of the collector is attached to a dock
Below right: Typical attachment of top end to a dock, showing the AERC float.

Sea Scallop Spat Collector Deployment Photos

Above left: Sea scallop spat bags laid out on a dock before deployment
Above right: Neil Savage lowers the bags over the edge of the dock
Below left: Another view of the spat bags being lowered into the water
Below right: Typical attachment of spat bags to dock

Above: Deployment site in Back Channel, New Castle

Sea Scallop Spat Collector Retrieval Photos



Above left: Neil Savage pulls up spat bag
Above right: Close-up of the retrieved bag
Below: Close-up of organisms found on bag

Bring AERC's new

Shellfish Tour

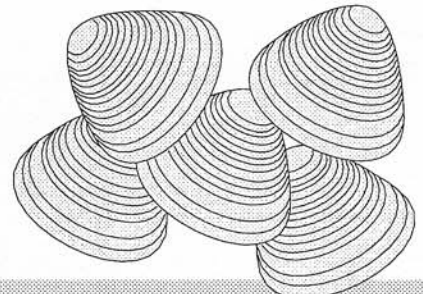
to your School!

AERC

For a limited time this fall, the Aquaculture Education and Research Center in Hampton is touring the area with live shellfish presentations. Each presentation lasts about an hour, and includes a variety of animals for hands on exploration:

- Did you know a clam can live to be 220 years old?
- See a clam that actually leaps out of the sand to escape predators.
- Another that squirts at you if you get too close!
- Learn how oysters make pearls.
- Count the blue eyes on a scallop.
- There's a digging demonstration featuring the 5 inch long razor clam.
- Watch them create a current in completely still water just by siphon action!
- Which shells were used as money in colonial NH?
- How do shellfish scrub our water clean in Great Bay?
- Find great ideas for getting involved in coastal conservation.

Shellfish are an important part of our local ecology. Learn about clam studies in the Hampton-Seabrook estuary and other examples of shellfish research on the Seacoast.



All AERC projects are interdisciplinary. You will find that they fit nicely into the content standards embodied in the National Science Education Standards, including:

- Unifying concepts and processes in science
- Science as inquiry
- Life science
- Science and technology
- Science in personal and social perspectives
- History and nature of science

ograms are lead by local shellfish expert Dr. Neil Savage. Dr. Savage holds a Ph.D. in oceanography and provides wealth of knowledge for your students. His presentations are always interactive, with lots of demonstrations, tivities and opportunities for hands on exploration.

Contact AERC staff at 603/926-1650 for fee information and scheduling.
AERC's shellfish outreach is funded through a generous grant from the New Hampshire Estuaries Project.

Oysters, cherrystone clams, long neck clams, ocean quahogs, sea scallops, surf clams, razor clams and more!

Shellfish Stewards

AERC

You're Invited...

Saturday, November 22

to an informal Brunch

from 10:00-11:30am

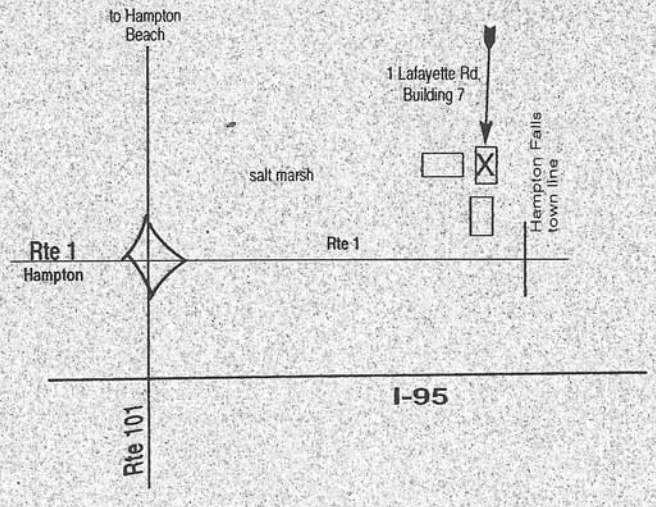
Meet our growing group of Shellfish Stewards and learn about the project you play an important part of on the Seacoast.

Tour our working aquaculture facility, and join us afterwards for a salt marsh exploration.

RSVP

by phone 603/926-5446, fax 603/926-5278,
or online at aerc2000@aol.com

Directions to **AERC**



AERC

Calling All Dock Owners!

We need you to help protect New Hampshire's young oysters and scallops.

The Aquaculture Education and Research Center (AERC) is launching a new conservation effort on the coast and into Great Bay to catch and grow baby scallops and oysters. Anyone with a saltwater or brackish water dock can become one of the region's first Shellfish Stewards.

All you need to do is deploy a mesh bag called a "spat collector" from the side of your dock or unused mooring. The collector is designed to catch larval shellfish and encourage them to settle in the bag. There, they will grow for about a year to reach a size big enough for us to collect them and throw them into the water over existing and historic oyster beds and scallop grounds.

AERC is signing up the first 20 dock owners interested in participating in the Shellfish Stewards program for a special workshop on **Saturday, June 28**, from 10:00-noon to get you started. With enough docks, and many stewards, our goal is to increase shellfish populations by helping to provide alternative settlement sites in our region, jumpstarting the growth of new generations of scallops and oysters.

For more information visit AERC online at www.teachfish.org or call 603/926-5446. The Shellfish Stewards project is supporting by funding from the New Hampshire Coastal Program, New Hampshire Estuaries Project, and Greater Piscataqua Community Foundation.

Aquaculture Education and Research Center
P.O. Box 1624 • Hampton, NH 03843-1624 • phone:603/926-1650 • fax:603/926-5278
www.teachfish.org

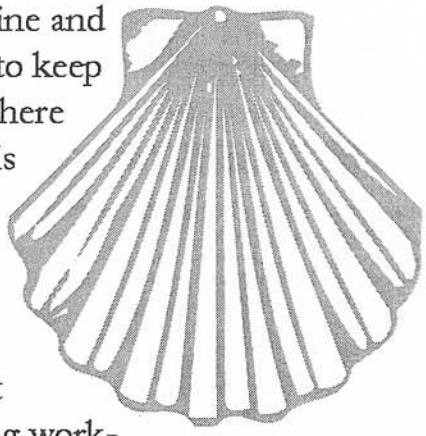
AERC

become a Shellfish Steward

and help restore New Hampshire's scallops and oysters

The Aquaculture Education and Research Center is recruiting members of the seacoast community to participate in a new program to help restore oysters and scallops to our depleted stocks. The process is simple. Deploy a rope line with special mesh bags attached to it off a salt-water dock or buoy in the summer or fall, then pull up the bags in the spring. When the shellfish spawn during the year, each tiny oyster and scallop spat (larvae) finds a place to settle and grow. The mesh bags provide a perfect place, encouraging settlement where the tiny spat can grow and thrive under your protection. In the spring, every steward comes together with their collectors to harvest the baby shellfish - each about the size of a thumbnail by then. All the oysters and scallops collected are taken out by fishing vessels to reseed existing shellfish beds in our local waters.

Anyone with access to a dock or buoy can become a Shellfish Steward.



All we need from you is the committment to be a caretaker to the line and the tiny shellfish that settle there. To be successful, each line needs to keep the spat bags submerged underwater. We suggest deploying where there is at least 4 feet of water at the lowest tide, to be safe. If your dock is along the coast or in coastal waters, your target will be scallops. If your dock is in Great Bay, or more brackish water, your target will be oysters.

We provide you with all the equipment you need to deploy one spat collector. As a Shellfish Steward, we ask that you attend a late spring workshop to learn how the system works, what the goals of the program are, and how your work as a Steward will make an impact.

If you would like to become a Shellfish Steward, please contact AERC staff at 603/926-1650. For more information and updates on the program, visit our website at www.teachfish.org.

Consider becoming one of AERC's Shellfish Stewards. Spend a few hours this year making sure New Hampshire has shellfish in the years to come.

The Shellfish Stewards program is supported by the New Hampshire Coastal Program, New Hampshire Estuaries Project, and the Greater Piscataqua Community Foundation.

Dockside Shellfish Aquaculture Project

By Dyanna Smith, Director of Aquaculture Education and Research Center

With the help of the New Hampshire Coastal Program (NHCP) and the Greater Piscataqua Community Foundation (GPCF), the Aquaculture Education and Research Center (AERC) is laying the groundwork for a new project soliciting coastal landowner's volunteer participation in shellfish aquaculture and coastal conservation. The Dockside Shellfish Aquaculture Project allows AERC to collaborate with coastal property owners by recruiting and training volunteer "keepers" to collect juvenile shellfish from the waters around their docks. The collected shellfish will then be used to reseed known local shellfish beds.

AERC has six pilot research sites that are currently testing the methodology of using spat collectors close to the shoreline, either attached to a dock or pier, or floating next to one. Our goal is to launch the dockside shellfish aquaculture project in the community, with the target of 20 locations collecting spat from summer 2003 until spring 2004.

We are focusing on collecting the spat (seed) of two types of mollusc an shellfish found locally in the wild: sea scallops (Placopecten magellanicus), and American and European oysters (Crassostrea virginica, Ostrea edulis). Because sea scallops are presently a commercially harvested species, providing for additional spat collection will aid in recruitment and restoration of the fishery. Stock replacement currently relies solely on replenishment by natural settlement and recruitment. The New Hampshire Estuaries Project Management Plan identifies "limited availability of suitable larvae attachment substrate" as a likely factor in shellfish population decline. This program would augment natural population replenishment through artificial (aquacultural) means by providing alternative "substrate" for settlement in the form of mesh bags.

Releasing the collected juvenile shellfish may also help in restoring depleted populations on grounds that formerly held scallop and oyster beds. Wild oysters are presently a recreationally harvested species but are known to play an important role (as most bivalve molluscs do) as "living filters" - improving water clarity and quality. Therefore, you can never really have too many oysters working in any bay impacted by human activity. The need to restore and enhance existing oyster bars in Great Bay and Little Bay is great.

Why collect spat under docks? Every year oysters and scallops spawn into local waters, and the resulting seed needs places to settle and grow to maturity. In the wild, shellfish such as the sea scallop release eggs and sperm into the water column in early fall for fertilization. Reproduction is often triggered by other shellfish spawning in the area. Fewer scallops on a bed means less chance for egg fertilization, and this may be one of the situations contributing to scallop population decline. When fertilization does occur, the larvae, or spat, that result float throughout the water column for approximately 40 days. They then find a hard surface on which to settle. Our spat collectors should provide such a place.

There is current spat collection research being done in the Gulf of Maine, but the sites are primarily in deeper ocean water. Collecting seed oysters and scallops at or near existing docks has the advantage of easy accessibility. By contrast, placing spat collectors at sites that can only be accessed by boat and tended by divers intensifies labor effort and expense. Our program

relies heavily on volunteer "keepers" to provide care and maintenance of the collectors, report any findings, and be "first responders" in an exigency. Such intensive care should have advantages over leaving collectors to the mercies of the current, tide, and foul weather, possibly for days and weeks.

The project is based out of Hampton, where AERC is located. Sites are targeted for Great Bay, the Piscataqua River, Hampton-Seabrook harbor, Rye harbor, and other tidal waterways where larval shellfish are anticipated. We have pilot sites at Wentworth Marina, Barker's wharf on the Piscataqua, the New Castle coast guard pier, Gosport Harbor on Star Island, Rye Harbor Marina, and Great Bay Marine (this site is supervised by classes of 5th and 6th graders attending Newington Elementary School).

We want to make the dockside project very visible, to bring the public into greater contact with the project and raise general awareness of needs to conserve marine resources, such as shellfish. For example, the Little Harbor area has had difficulty with enforcing the rules for bilge pumping at the end of the season. Excess nutrients degrade the habitat. The Wentworth Marina is serving as a pilot site in hopes that signage from the project will help educate boaters and encourage them to refrain from prohibited dumping in the open water.

AERC has designed its approach based on the input of other researchers and uses a successful model for under-dock oyster collecting in Chesapeake Bay that involves community volunteers. The Chesapeake Bay program, called "Oyster Gardeners" is a highly successful campaign to reseed Bay oyster beds and educate the public on the issues of water quality in the Bay. Our project applies a similar method and philosophy to Great Bay and the coastal New Hampshire waters.

AERC is recruiting keepers. During the spring and early summer, new keepers will have the option to attend one of two workshops which will describe the project in detail. The workshops will also provide materials and training for building, then deploying, their spat collectors. AERC's website will be expanded to include up to date information on the timing for keepers to deploy at their sites. The web site will also provide shellfish information, a resource for keepers with current events related to the project, and a special page for keepers to post observations or maintenance details and share information.

During the winter and early spring, keepers will periodically pull up their collectors to remove predators, such as starfish and green crabs. (Collectors are designed specifically to suspend in the water column in a way that prevents predators from access to the spat as much as possible.) In the spring, keepers again have the option of attending either of two workshops, and will bring in their spat bags to harvest whatever they catch. The spat will be distributed to local fishermen (most likely lobster boats) who will spread them over identified oyster and scallop beds for reseeding.

This is a project that AERC hopes will grow into a yearly program in the coastal community. Our long term expectations for the project are to increasingly recruit shoreline property owners as participants, expand the reach of our educational messages, and, over time, be able to see an increase in juvenile shellfish found in our dockside collectors as New Hampshire shellfish populations grow. Of course, our ultimate goal is to increase the population of local shellfish so recreational shellfish enthusiasts have improved opportunities to collect scallops and oysters in our area.

AERC

Seacoastonline
The Source for the Seacoast

Hampton, NH Tuesday, August 12, 2003

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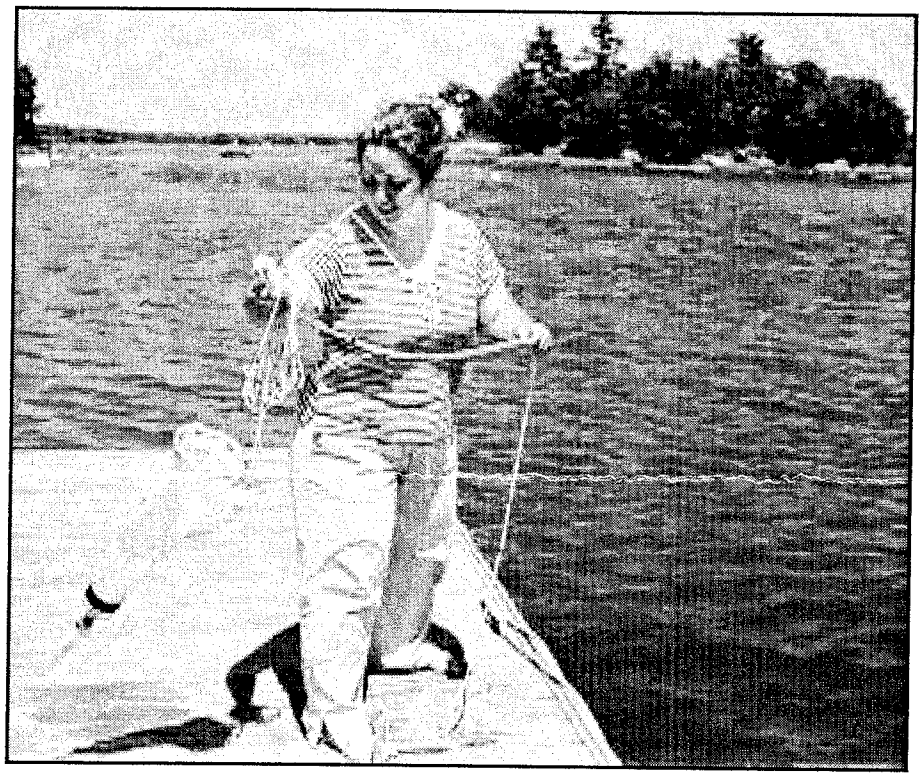
The Hampton Union



Aquaculture Education Research Center Executive Director Dyanna Smith prepares to drop plankton tow off a dock at the home of Sharon and Arthur Pierce in Durham Point to sample the water of Little Bay.
Staff photo by Steve Craig

Foster bi-valves

By STEVE CRAIG
currents@seacoastonline.com

They are out there, floating, drifting and - if a bi-valve mollusk

Portsmout
Exeter Ne
Hamptor
Rockingha
Dover Co
Ne
York W
York Cou
Sta

York County
Coast Star
York Weekly

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Circulation

at the larvae stage can hope - even hoping, for a safe and nurturing spot to land. They are the microscopic beginnings of an oyster, or a scallop. They've been a part of coastal New Hampshire waters from time uncharted. Like so many other creatures of the deep, their numbers have dwindled, their voluminous beds decreased.

A dedicated staff of environmentalists, scientists and interested citizens is doing its best to give them some new alternative homes. The staff members are the people behind the Aquaculture Education and Research Center (AERC), a nonprofit group with an annual operating budget of about $100,000 that has office space in Hampton.

"Our goal is to raise community awareness," says Dyanna Smith, AERC's active, hands-on executive director. To help in that endeavor, Smith began a project called Shellfish Stewards last fall and is stepping up efforts to increase the project this summer. The basic concept is simple: Recruit willing citizens or commercial dock owners to hang a rope off their dock with a mesh bag attached to it. The supplies are provided by AERC. The mesh bag is designed to simulate a "nesting" area for the baby oyster or scallop larvae (often called spat or seeds). Maintenance is minimal. The bags are put in the water in summer and then pulled up the following spring. Once a month during that time the dock owner is asked to briefly pull the bag up to clear mud, algae or other debris that could be fowling the bag and limiting its effectiveness.

"Throughout the whole year it might take 20 hours of the dock owner's time," says Smith. "That includes training and collection workshops."

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As Savage explains it, established programs like the wild scallop project in Maine now have enough data to know that if a spat collector is put in a certain location that developing scallops will be found in the bag the next spring. The administrators of AERC and the shellfish stewards try to use critical thinking, reasonable expectations and previously proven techniques in their search for the microscopic organisms that might just turn out to be an oyster. Then comes faith, or blind luck, depending on one's scatological inclination. Imagine hoping that the wind blows the haystack around enough that the proverbial needle just happens to stick itself into a nearby pincushion.

The "clutch" bag set on the end of Sharon and Arthur Pierce's dock on Little Bay is like that pincushion. There are oyster larvae out in the current. At least a few. Smith and AERC board member Neil Savage of Exeter have confirmed this by throwing a netted bag, called a plankton tow, into the water, retrieving it, then analyzing the water sample.

But it's a long process to go from larvae in the water to a maturing oyster in the clutch that is large enough to "seed," or place, on a pre-existing oyster bed.

One problem the project encountered was the ravages of Mother Nature. Six spat collector bags designed to promote scallop growth (the concept is the same as the oyster clutch, though the design is different) were placed in area waters this past fall. Unusually heavy ice around docks caused five of them to be dislodged and lost. In some cases the entire dock was destroyed.

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"The wording of the notice I read was to 'replenish the shellfish,' and it seems to be that everything you read is depletion of, depletion of, depletion of," she says. "Never do you read replenish."

Further, the 25-year resident of Durham says, "We're pretty blessed having this (property) and if we could be of any help, so be it."

When Savage takes that day's plankton tow sample back to the AERC's modest microscope, which has a crack in its left lens, he finds a tiny oyster larvae. Savage, who has a doctorate degree in oceanography, notes that this one will never reach an AERC collection site. Its purpose has been to reinforce the hope that the Pierce's dock could prove a bountiful location, assuming that more larvae beat the naturally long odds of survival and find one of the two clutch bags hanging from the dock. A female oyster will produce between 400 and 3,000 eggs but 99 percent of those will die before reaching the earliest of several larvae stages.

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with the for-profit firm Aquatic Research Organisms. Inside the tank were a couple dozen inch-long fish swimming about. Ten or 12 of them might make a decent snack for a bass. Smith explained that these fish are not mere bait. Rather they are among the last of a species that had lived in one of seven small, inter-connected ponds in Mexico. Their particular pond dried up. Were it not for aquariums, this species would be extinct, Smith says.

A visitor crassly asks, why should anyone in Seacoast New Hampshire care about a tiny Mexican fish with a long name? So what if this breed, which no longer has a home, had ceased to exist? For that matter, what's the big deal if the few remaining scallops in Seabrook Harbor or the oysters in brackish Great Bay aren't replenished?

Smith responded by noting that one goal of aquaculture is to maintain the "bio-diversity" of a water source. Also, the reasons why a small fish faces extinction can indicate greater issues that could - if not in our generation, then in the future - be of great concern to any human.

Later in the day, the visitor begins to ascend the General Sullivan Bridge, passing over the swirling tidal meeting place of Little Bay and the Piscataqua River. It is then that some of Smith's argument strikes a chord. The sharp brilliance of the blue, mid-tide water, dotted with white watercraft, framed by the shoreline's brown, gray and green hues, is a brilliant milieu of nature and human activity. Somewhere in the swiftly running current are the unseen minutiae. The Mexican fish isn't part of this picture but thousands of oyster larvae must be.

Anyone interested in being a shellfish steward should contact AERC Executive Director Dyanna Smith at 926-5446. More information about shellfish steward program is available at AERC's Web site, www.teachfish.org.

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Globe North
THE BOSTON GLOBE THURSDAY, JUNE 26, 2003

Volunteers to be trained to save shellfish in N.H.

By Clare Kittredge
GLOBE CORRESPONDENT

HAMPTON, N.H. — From a building perched on the edge of the town's vast coastal salt marsh, a new conservation effort seeks to catch and grow baby oysters and scallops to boost their sagging populations.

This Saturday, the Aquaculture Education and Research Center in Hampton will hold a workshop for its first 20 volunteer dock owners, dubbed "shellfish stewards." Anyone with a saltwater or brackish water dock can become one of the region's first such stewards, according to the center.

'There's a lot of evidence that shellfish populations are lower than in the past. We want to get the community involved. . .'

DYANNA SMITH
executive director of the Aquaculture Education and Research Center in Hampton, N.H.

"There's a lot of evidence that shellfish populations are lower than in the past," said Dyanna Smith, executive director of the Aquaculture Education and Research Center. "We want to get the community involved in a really direct way."

The AERC was organized in 1996 by the University of New Hampshire Cooperative Extension and spun off as a non-profit in 1999, according to Smith.

Although shellfishing in New Hampshire is limited to a recreational harvest only, marine biologists say the state's shellfish are in decline. New Hampshire's marine shellfish include American and European oysters, two kinds of mussels, blue and ribbed, sea scallops, and several species of clams, according to Smith.

A management plan drawn up in 2000 by the New Hampshire Estuaries Project reported that the density of three major oyster beds in Great Bay dropped anywhere from 42 percent to 69 percent between 1991 and 1996.

The same management plan cited state data that 2,700 bushels of oysters were harvested from the area in 1997, down from 5,000 bushels in 1991.

The management plan also reported that softshell clams in the Hampton-Seabrook estuary peaked in the early to mid-'80s, then declined sharply, "most likely due to intense recreational and illegal harvest pressure."

Bruce Smith (no relation to Dyanna Smith), a marine biologist for the New Hampshire Fish and Game Department in Durham, said the drop in oyster populations is "most likely due to a disease called MSX, caused by a protozoan, a simple one-celled organism that can kill oysters."

Although the drop in clam numbers is "subject to some speculation," Bruce Smith said the leading candidates are human predation, a clam disease called neoplasia, predation by green crabs, and possibly a "very high" early mortality rate.

While other organizations such as the University of New Hampshire are working on clam restoration, the Aquaculture Education and Research Center is targeting oysters and scallops.

Volunteers will deploy a mesh bag called a spat collector from the side of their dock or unused mooring. The collector is designed to catch larval shellfish and encourage them to settle in the bag. There, they will grow in about a year to a size big enough to collect and throw back into the water over existing oyster beds and scallop grounds, Dyanna Smith said.

Over the next few weeks, volunteers will hang bags from their docks to attract baby oysters. They will do the same for scallops in early fall, Smith said.

Volunteers will need at least 4 feet of water at low tide because "spat" or larval shellfish must always stay submerged without hitting bottom, where predators such as green crabs can eat them, said Dyanna Smith.

After about a year, Smith said, the shellfish will be large enough — about the size of a thumbnail — to collect and for fishermen to scatter in the water to help repopulate existing shellfish beds.

Bruce Smith said it takes five to six years before an oyster is of four- to five- inch harvesting size.

"We'll see," he said. "I wish the best for them. There are a lot of ups and downs. Predation and physical stress make it a tough existence for oysters."

Volunteer Jen Kennedy soon plans to hang out her mesh bag from a dock in Portsmouth. Two years ago, Kennedy cofounded the Blue Ocean Society for Marine Conservation, a non-profit group focusing on the Gulf of Maine. She now runs marine educational programs for the Isles of Shoals Steamship Company in Portsmouth.

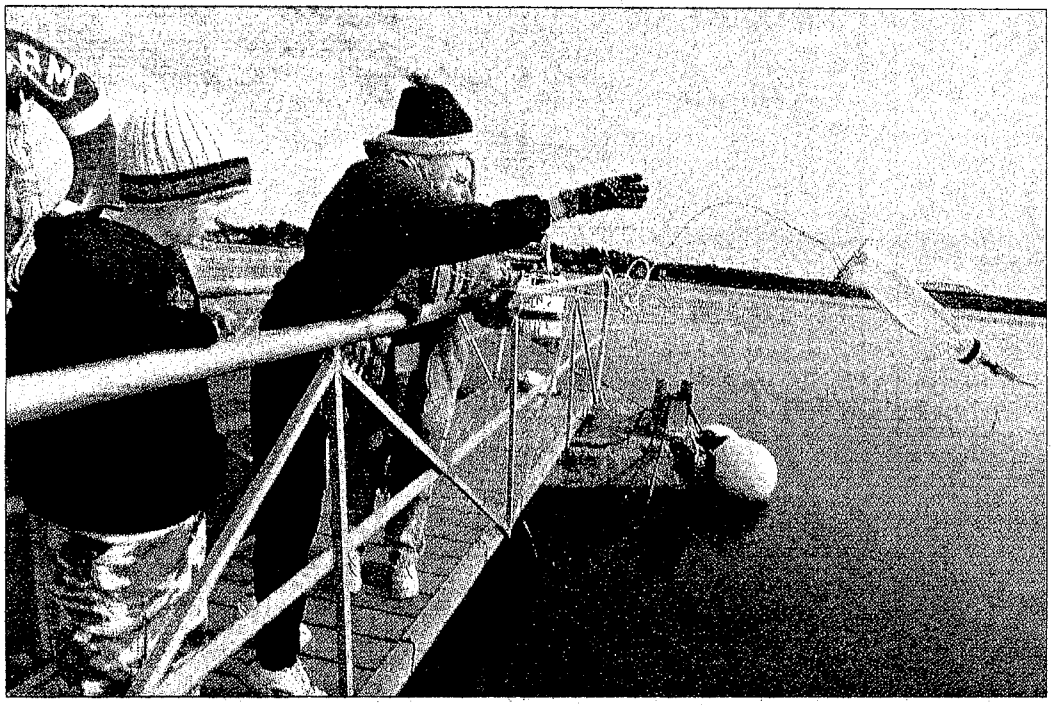
"Adding more shellfish is a good thing to do," said Kennedy. "Our mission is to teach people about responsible growing of fish, and this is one more thing we can offer the people who come to us."

For more information, visit AERC online at www.teachfish.org or call 603-926-5446.

PORTSMOUTH HERALD

VOL. 114, NO. 294 WEDNESDAY, OCTOBER 23, 2002 © SEACOAST NEWSPAPERS COVERING NEW HAMPSHIRE & SOUTHERN MAINE 3 SECTIONS 30 PAGES

Local students get a glimpse at undersea world



Rich Beauchesne/rbeauchesne@seacoastonline.com

Newington Elementary School sixth-graders, Collin Stern, 11, left, and Louise Daigle, 11, lauch a plankton tow with the help of Dyanna Smith, the executive director of the Aquaculture Education and Research Center at the Great Bay Marine.

Fifth- and sixth-graders from Newington launch project to track development of marine life

By Darek Fanton
dfanton@seacoastonline.com

PORTSMOUTH — A group of Newington Elementary School students went fishing Tuesday morning for a catch they could hardly see.

Twenty-three fifth- and sixth-graders deployed a catch bag into the back channel of the Piscataqua River, off of a dock at the Great Bay Marina in Newington. The students hoped to capture a variety of marine life and are specifically interested in baby scallops just out of the larvae stage — which are called spat.

"In a hands-on experiment they learn a lot more," said Kathy Dufton who's son Josh took part in Tuesday's deployment. "Plus they get to see people in their careers."

The Newington program is one of six pilot sites that have been set up by the nonprofit Aquaculture Education and Research Center (AERC). What makes the Newington program unique is the involvement of the students.

See AERC, Page A11

Newington students participate in project that watches mollusks grow

AERC, from Page A1

"They have a chance to start this program and see it grow in the community," said Dyanna Smith, executive director of AERC.

Smith's group was founded in 1996. AERC's primary focus is to promote intensive aquaculture, and to provide hands-on training and scientific investigations into aquatic conservation. The group relies on three programs: education and outreach, like the Newington project; general aquaculture research and the AERC aquatics resource center based in Hampton.

AERC has set up the six test sites in the hopes that some time in the near future, they may encourage private citizens to get involved with aquaculture. Smith says she hopes to soon see catch bags and research equipment on private docks throughout the area.

"Anyone with a dock will be able to deploy these," she said.

The Newington students from Kim Lodge and Shawn Looser's fifth- and sixth-grade classes spent Tuesday morning assembling the catch bag with the help of Dr. Neil Savage, research coordinator for AERC. As Savage described it, a large, mesh onion bag was filled with a material called Netron, a fine blue mesh which was rolled up to fit into the bag. The Netron acts as an artificial settling surface for spat and other marine life which latch on and begin to grow.

"What's really cool is that it catches everything. The students will pick out star fish, which are the predators for scallops, so we'll have predator and prey living and growing in the same environment."

Dyanna Smith
AERC executive director

"The spat start off at a quarter of a millimeter," said Savage. "They grow all winter and end up the size of a dime or a nickel."

Once the bag was assembled it was closed and tethered to a length of rope with a weight on the end. The students watched as Savage lowered the catch bag into the water. The location for the bag was chosen based on the rapid current of the back channel and the relative shallow water, only 20 feet deep or so.

According to Smith, the bag will stay submerged until early next year when it will be raised in order to check the progress of its captured specimens. It will then be replaced and remain in the Piscataqua until April when the students will open the bag, unroll the Netron and count and catalog its contents.

"What's really cool is that it catches everything," Smith said. "The students will pick out star fish, which are the predators for scallops, so we'll have predator and prey living and growing in the same environment."

Tuesday's deployment also offered the researchers an opportunity to demonstrate a plankton tow. A fine mesh bag with a catch cup at the end is pulled against the current to gather plankton specimens which can then be viewed by the students under a microscope. As Smith described it, plankton is the "living soup" of microscopic organisms that grow to become plant and animal life.

Newington student Louise Daigle helped to reel in the plankton tow and said she's excited about the spat project and the potential results.

"I think it's going to do well," she said, hopeful that the catch bag will reveal a variety of life when it's opened in April.

The students on hand Tuesday got to take a look at what the plankton tow brought in.

Mike Tammik, one of the students taking part in the project, described the findings,

"It's mostly dirt and some grass, but we got a couple of plankton," he said.

Tammik said that he expects the catch bag to bring in a lot of different types of animals and that the project has given him and his fellow students a chance to see things they wouldn't ordinarily experience.

"None of them understood marine aquaculture until today," said Smith. "We need a lot of fresh minds in the field, and these kids get it now."

AERC is funded by the New Hampshire Office of State Planning's Coastal Program, the New Hampshire Estuaries Project and the Greater Piscataqua Community Foundation. For more information log onto AERC's Web site at www.teachfish.org.

MARINE FORECAST

Tonight, winds will blow northwest 15 to 20 knots with a few gusts at 25 knots. Seas will be at 2 to 4 feet, with a chance of light rain after midnight. Wednesday and Wednesday evening, winds will blow northwest 15 to 20 knots, with seas at 2 to 4 feet.

PORTSMOUTH HERALD

VOL. 115, NO. 231 WEDNESDAY, AUGUST 20, 2003 © SEACOAST NEWSPAPERS COVERING NEW HAMPSHIRE & SOUTHERN MAINE 3 SECTIONS 28 PAGES

PLANTING *seeds*

Nonprofit aquaculture group still seeking dock owners for oyster, scallop pilot program

By STEVE CRAIG
features@seacoastonline.com

They are out there, floating, drifting and — if a bi-valve mollusk at the larvae stage can hope — even hoping, for a safe and nurturing spot to land. They are the microscopic beginnings of an oyster, or a scallop. They've been a part of coastal New Hampshire waters from time uncharted. Like so many other creatures of the deep, their numbers have dwindled, their voluminous beds decreased.

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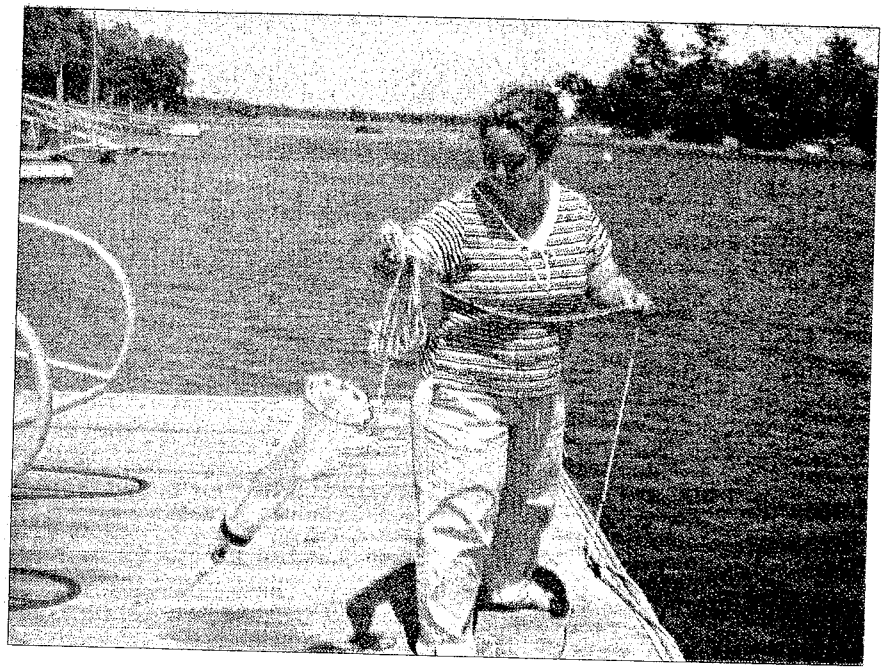
See SHELLFISH, Page C3



STEVE CRAIG photo

Auquaculture Education and Research Center Executive Director Dyanna Smith prepares to drop plankton tow off a dock at the home of Sharon and Arthur Pierce in Durham Point to sample the water of Little Bay.

Aquaculture group seeks help with shellfish project

SHELLFISH, from Page C1

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"Our goal is to raise community awareness," says Dyanna Smith, AERC's active, hands-on executive director. To help in that endeavor, Smith began a project called Shellfish Stewards last fall and is stepping up efforts to increase the project this summer. The basic concept is simple: Recruit willing citizens or commercial dock owners to hang a rope off their dock with a mesh bag attached to it. The supplies are provided by AERC. The mesh bag is designed to simulate a "nesting" area for the baby oyster or scallop larvae (often called spat or seeds). Maintenance is minimal. The bags are put in the water in summer and then pulled up the following spring. Once a month during that time the dock owner is asked to briefly pull the bag up to clear mud, algae or other debris that could be fowling the bag and limiting its effectiveness.

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Smith says she's willing to commit about half of AERC's budget to the Shellfish Steward program and has done significant fund-raising to back up her enthusiasm. One of the most critical aspects for future success is to increase the number and locations of the collection sites.

Sites and the stewards who own them must meet certain criteria.

- Most important is that the dock or mooring is located in at least 5 feet of water at low tide.
- The rope line needs to be set in a spot that provides a 6-foot radius without boat traffic.
- Dock owners must check the site once a month or allow AERC staffers to do so. Smith says they are happy to work with dock owners who are not year-round residents.
- Shellfish stewards are required to attend a training workshop on the project.

Sharon Pierce said the purpose of the Shellfish Steward project appealed to her.

"The wording of the notice I read was to 'replenish the shellfish,' and it seems to be that everything you read is depletion of, depletion of, depletion of," she says. "Never do you read replenish."

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In Partnership With

GREATER PORTSMOUTH CHAMBER OF COMMERCE

Market Square Day 2003
Saturday, June 14th
9:00am – 5:00pm

March 2003

Dear Vendor,

On June 14th, we celebrate the **26th Annual Market Square Day**! Long recognized as the official kickoff to summer on the Seacoast, this year is especially meaningful as we announce the partnership of Pro Portsmouth, Inc. and The Greater Portsmouth Chamber of Commerce in producing Downtown Events.

Enclosed is an Application For Booth Space. Please complete both sides, attach all necessary photos, documents, checks and return to our office. **PLEASE NOTE: Market Square Day celebrates Portsmouth and the Seacoast, so priority is given to Portsmouth and Seacoast Participants. In addition, Pro Portsmouth, Inc. does reserve the right to limit the overall number of vendors participating in the Festival, or to reduce numbers in a category, particularly if there is an overabundance of vendors in any one category (i.e. food, t-shirts, etc.). Applicants filing late or incomplete paperwork run the risk of being denied booth space.**

Please note - we are not allowing Raffles as part of any Booth presentation – this pertains to all participant categories.

ATTENTION! As part of our continuing effort to respond to Festival feedback, all Media participants (radio) should note that we respectfully request that you do not broadcast your station's music from your Booth/Van location. We will be happy to discuss alternative suggestions for broadcasting from the Festival area.

If your application is approved a confirmation letter will be mailed to you. You will also receive information regarding Booth placement, Festival color scheme and theme as well as lots of other information that will hopefully assist you in having a terrific day.

All vendors must provide Pro Portsmouth with a Certificate of Insurance for public liability. This is proof of your business insurance and that it will, in fact, protect your booth, booth space, yourself, anyone and anything related to or coming into contact with your booth's operation. Coverage of $1,000,000.00 is required. The Certificate must state that Pro Portsmouth, Inc. is an additionally insured party and include the date of Saturday, June 14, 2003. Past participants may recall having the ability to obtain insurance for the day through Pro Portsmouth. Due to cost issues, we are no longer in a position to offer this service to you. We apologize for any inconvenience that this may cause you or your organization.

Depending on your Booth (Non-Food or Food), there is either a $75.00 or $100.00 Security Deposit required. This will be returned to you within two weeks of Market Square Day provided your booth area passed a satisfactory inspection at the conclusion of the Festival.

Should you have any questions, please contact bmassar@portsmouthchamber.org or 436 - 3988. Remember that date – Saturday, June 14th.

Best regards,

Barbara Massar

Barbara Massar
Director of Downtown Events

Dear Market Square Day Vendor:

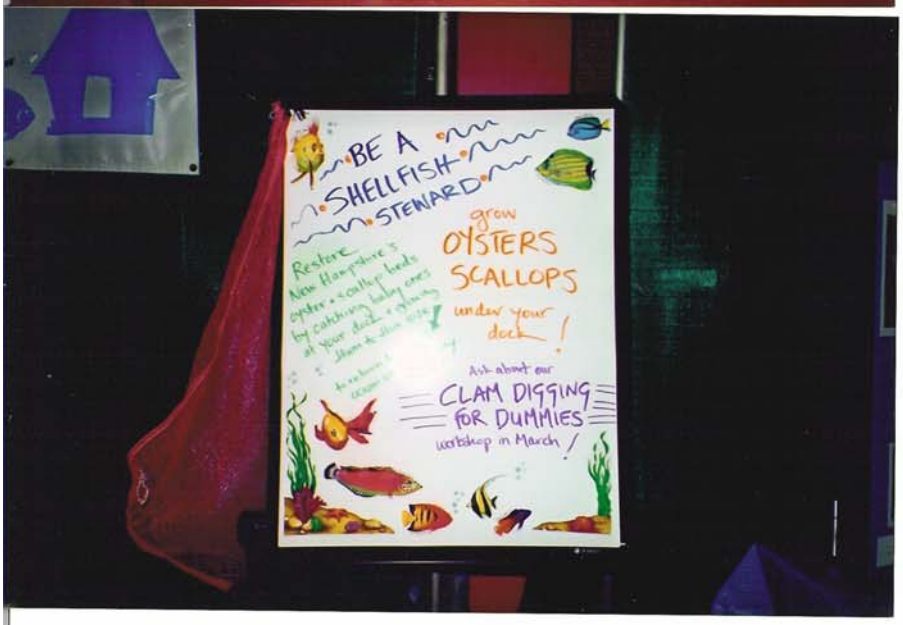
Your application for the 26th Annual Market Square Day on Saturday, June 14th 2003 has been approved and accepted.

Further information, including Booth Permit and map, will be forwarded to your attention several weeks before the Festival.

Special Reminder to Food Vendors: You are required to obtain a separate permit to operate your booth from the Portsmouth Health Officer.

Best regards,
Barbara Massar, Director – Downtown Events
Email: bmassar@portsmouthchamber.org
Pro Portsmouth, Inc.
P.O. Box 967
Portsmouth NH 03802
Phone: 603-431-5388 - Fax: 603-431-3415


Aquaculture Education
and Research Center
AERC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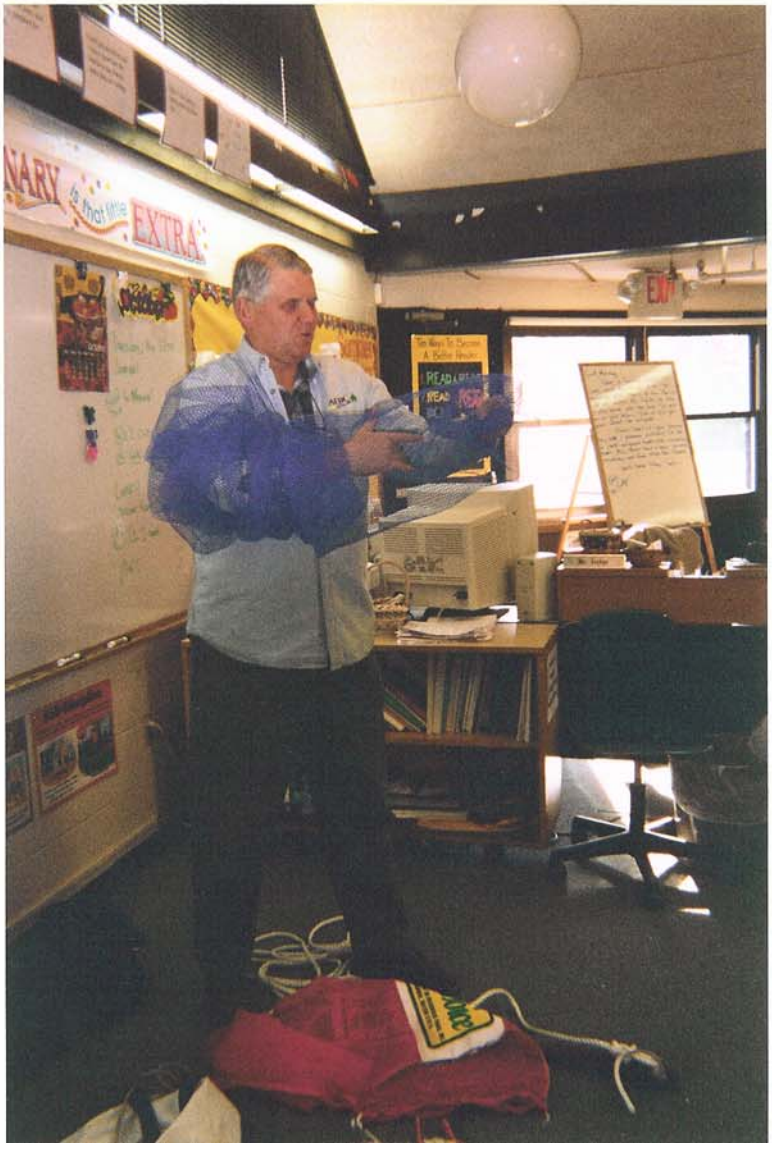
EXTRA
EXIT

Shellfish Advisors

Neil Savage, Aquaculture Education and Research Center
Research Coordinator and interim president, Shellfish pilot project principal investigator.

Ray Grizzel, University of New Hampshire (UNH), Jackson Estuarine Laboratory
Senior laboratory member, provides assistance to AERC and forwards resources.

Rich Langan, University of New Hampshire, Cooperative Institute for Coastal Estuarine Environmental Technology (CICEET)
Expert on shellfish aquaculture.

Marsden Brewer, Commercial fisherman
Mr. Brewer directs wild scallop enhancement projects in several coastal communities throughout Maine.

Craig Pendleton, Director, Northwest Atlantic Marine Alliance (NAMA), Saco ME.
NAMA is conducting a wild scallop enhancement project in Saco Bay.

Brian Beal, University of Maine, Machias. Shellfish researcher
Employed at Beal Island Hatchery, sea scallop biologist.

Peter Flanigan, Commercial fisherman, Rye NH.
Represents local knowledge and fishery experience.

Christopher Nash, NH Department of Environmental Services (DES).
Qualifies areas for shellfish harvesting; shellfish sanitation survey.

Ken Lavalley, Senior Biologist, Spinney Creek Shellfish Co, Elliot ME.
Provides live shellfish for educational purposes, aquaculture support in general.

Sally Soule, New Hampshire Estuaries Project (NHEP)
Oversees current funding for AERC's shellfish outreach project.

Verna Delauer, New Hampshire Coastal Program (NHCP)
Outreach Coordinator, co member of Coastal Education Initiative with AERC

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Open Ocean Aquaculture Project Coordinator

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Online Shellfish Resources

U.S. Web Sites

Information on oyster gardening (Chesapeake Bay Foundation site):
http://www.cbf.org/action/outdoors/oysters.htm

Giving scallops a helping hand (feature article reprinted from Commercial Fishing News)
http://www.fishresearch.org/Articles/2001/09/Scallop_Spat.asp

Criteria for growout site selection (interview notes from a mollucan aquaculture technician) :
http://www.k12.nf.ca/kingacademy/grassroots/Interview.html

New Haven Oysters http://www.qrwa.org/Education/New_Haven_Oysters.html

Economic Benefits of Connecticut 's Oyster Farming Industry
http://www.state.ct.us/doag/business/aquac/oysecono.htm

Horn Point Laboratory (MD) Oyster Hatchery http://www.hpl.umces.edu/facilities/oysters.html

Franklin Institute's Online Oyster Page http://sln.fi.edu/fellows/fellow7/dec98/oysters/

Canadian Web Sites

Underwater World
http://www.dfo-mpo.gc.ca/zone/underwater_sous-marin/oyster/oyster.htm

American Oysters
http://www.naia.nf.net/oysters.html

Nova Scotia Department of Agriculture Species Sheets
http://www.gov.ns.ca/nsaf/aquaculture/species/index.htm

Search Words for Internet Exploration

shellfish restoration
aquaculture
oyster gardening
shellfish spat collection
shellfish larval settlement

VOLUNTEER TRAINING MANUAL

W e l c o m e

On behalf of the Aquaculture Education and Research Center, thank you for participating in the Shellfish Stewards dockside aquaculture program! You are now part of the regions first effort to get the community involved in restoring our limited shellfish populations. Your work as a Steward is very important, and we think it is as exciting as it is environmentally crucial. So, welcome, and thank you!

This manual includes an introduction to the project and what we were thinking when we started it. It explains the status of shellfish on the seacoast, and just what you can expect from your work as a Steward. Not only is it important that you understand why you are tending growing, young shellfish, but it is important that you be able to represent the program in the community as ambassadors for this good work.

Once you complete your training as a Shellfish Steward, whether it is at a group training session or individually at your Steward site, you will be responsible to deploy, care for, and collect the equipment for your site. We will make sure to answer all of your questions now, and during your time as a Shellfish Steward.

It is important to project into the community the message of what you are accomplishing as a Steward. We participate annually in Portsmouth's Market Square Day, and often speak to the community, and in classrooms, about our work.

Keep in mind that we are interested in what you have to say, your observations at your site, and your suggestions for the future of the program. AERC staff is always available to help troubleshoot your site and answer any questions as they arise. If you are interested in joining our outreach efforts, we encourage your participation and input.

Enjoy your work as a Shellfish Steward - and thank you for being a part of shellfish conservation on the seacoast!

Funding for this training manual was received through grants from the New Hampshire Estuaries Project, and the New Hampshire Department of Environmental Services.

P r e - T r a i n i n g E v a l u a t i o n

Please answer the following brief questions:

1. Why do you want to participate in AERC's Shellfish Steward program?

2. Why are shellfish important?

3. Do you currently do anything at your home to help promote good water quality in your area?

B a c k g r o u n d

"Declining shellfish populations and associated habitats are among the most significant living resource problems in coastal New Hampshire."
-New Hampshire Estuaries Project management plan

The purpose of the Shellfish Steward Program is to directly involve the seacoast New Hampshire community in shellfish aquaculture and coastal conservation, to apprise shoreline property owners of water quality benefits of shellfish, and to enhance local shellfish beds for future productivity.

We are focusing on collecting the spat (seed) of two types of molluscan shellfish found locally in the wild: sea scallops (Placopecten magellanicus), and American and European oysters (Crassostrea virginica, Ostrea edulis). Because sea scallops are presently a commercially harvested species, providing for additional spat collection will aid in recruitment and restoration of the fishery. Stock replacement currently relies solely on replenishment by natural settlement and recruitment. The NHEP Management Plan identifies "limited availability of suitable larvae attachment substrate" as a likely factor in shellfish population decline. This program seeks to assist the growth of the natural population through artificial (aquacultural) means by providing alternative "substrate" for settlement in the form of mesh bags.

Releasing the collected juvenile shellfish will help in restoring depleted populations on grounds that formerly held scallop and oyster beds. Wild oysters are presently a recreationally harvested species but are known to play an important role (as most bivalve molluscs do) as "living filters" - improving water clarity and quality. Therefore, you can never really have too many oysters working in any bay impacted by human activity. The need to restore and enhance existing oyster bars in Great Bay and Little Bay is great.

Why collect spat under docks? Every year oysters and scallops spawn into local waters, and the resulting seed needs places to settle and grow to maturity. In the wild, shellfish such as the sea scallop release eggs and sperm into the water column in early fall for fertilization. Reproduction is often triggered by other shellfish spawning in the area. Fewer scallops on a bed means less chance for egg fertilization, and this may be one of the situations contributing to scallop population decline. When fertilization does occur, the larvae, or spat, that result float throughout the water column for approximately 40 days. They then find a hard surface on which to settle. Our spat collectors provide such a place.

There is current spat collection research being done in the Gulf of Maine, but the sites are primarily in deeper ocean water. Collecting seed oysters and scallops at or near existing docks has the advantage of easy accessibility. By contrast, placing spat collectors at sites that can only be accessed by boat and tended by divers takes a great deal of labor and expense. Our program relies heavily on you, our volunteer "stewards" to provide care and maintenance of the collectors, report any findings, and be "first responders" in an emergency. The intensive care each Steward provides at their site has advantages over leaving collectors to the mercies of the current, tide, and foul weather, possibly for days and weeks .

The project is based out of Hampton, where AERC is located. Sites are targeted for Great Bay, the Piscataqua River, Hampton-Seabrook harbor, Rye harbor, and other tidal waterways where larval shellfish are anticipated. We have existing sites at Wentworth Marina, Barker's wharf on the Piscataqua, the New Castle coast guard pier, Gosport Harbor on Star Island, Rye Harbor Marina, and Great Bay Marine (this site is supervised by classes of 5th and 6th graders attending Newington Elementary School).

A further goal of the Shellfish Stewards program is to bring the public into greater contact with the project and raise general awareness of needs to conserve marine resources, such as shellfish. For example, the project helps educate boaters and encourage them to refrain from prohibited dumping in the open water where excess nutrients from human waste disposal causes serious environmental hazards such as introducing toxins into the water and into growing shellfish.

A t Y o u r S i t e

The first thing to do is determine what species you will be targeting at your site, since each one requires a different type of collector. The second consideration at your site is exactly where the best location is to hang the collector (s).

We use the range of salinity at your dock to determine your target species. Oysters grow in an average salinity of psu < 15, whereas scallops grow in an average salinity of psu >26. In simpler terms, the closer to the ocean your site is, the higher the salinity, and the more likely your site has the potential to host scallops. Those with sites in Great Bay and more estuarine type waters have a lower salinity, and will be better oyster sites. Chances are, you know what is found in the waters around your site already. If not, we can help you make the determination.

Starting in late summer to early fall, you will set out shellfish spat bags at your dock or mooring, and maintain them until the shellfish grow large enough for seeding. Timing is tricky for deployment, and a strategy will be decided on each year depending on weather conditions in the region.

AERC will arrange sample plankton tows in your area to pinpoint your specific deployment time as close to optimum conditions as possible.

Within the next few days, check on the bags at low and high tides to make sure that each bag is submerged at all times. You may need to adjust the depth of the rope as needed. Also, make sure during the first month to check on the site at the monthly low tide, as that is the most likely time any final adjustments need to be made for the season. It is critical that the bags be submerged continuously so that settling larval shellfish will not dry out, but also to avoid predators climbing into the bag if it rests on the bottom. The bags should float out into the water like flags on a flag pole in the wind at all times.

Once a month we ask that you check on the collectors. Look for predators such as crabs and sea stars, and pick them off. If the bag is heavily silted, swish it up and down in the water like a tea bag to release as much junk as possible. Young shellfish cannot survive if they are silted over. Record your monthly checks on the data sheet, and include any observations and the time you spent for our records.

After growout, everyone will be asked to pull up their collectors and either take them apart at their site, or transport them to the AERC facility. Collection strategy will likely change each year, so you will be given much more detail closer to the spring collection time. Any spat retrieved from your collector will

be distributed to local fishermen (most likely lobster boats) who will spread them over identified oyster and scallop beds for reseeding.

Notes on Your Site and Activities:

W a t e r Q u a l i t y

Did you know that the actions you take at home, as a shoreline property owner, can effect water quality beyond your shoreline? Your actions at home can also effect your success as a Shellfish Steward.

Erosion and Siltation have a huge impact offshore. Many homeowners enjoy the look of a cleared shoreline. Unfortunately, this allows a lot of lawn chemicals, dirt and fine particles to wash directly into the water when it rains. These particles can not only introduce toxins into the water, they build up in layers over the natural substrate, choking out the living ecosystem just offshore - including the baby shellfish you are helping to grow at your site! You can remedy this by leaving a "buffer" strip of native plants and shrubs at the water's edge, reducing the runoff from your property. A buffer strip will also help to stabilize your river banks.

If you are not on town water, making sure your septic system is maintained and in good working condition is crucial to good water quality in your watershed. Your leach field processes everything you wash down your drains, then puts it into the soil on your property. If your septic system doesn't work properly, you are releasing toxins directly into your soil and into the water. Inspect and clean your system every two to four years .

Using pesticides and fertilizers on your lawn or in your gardens can be harmful to the living organisms around your property, including those living in the water. If you treat your lawn with chemicals, the next time it rains all of that washes into the water off your property. If you use fertilizers it is recommended that you try a slow release nitrogen based fertilizer in the spring, and that you not use it within 25 feet of the shoreline.

When making decisions on your property, try to remember the basics of water management. Whatever can wash off in the rain and run into the water needs to be considered. If what you are doing will slow down the runoff of rainwater from your property, then it is likely to be beneficial to your natural ecosystem (such as planing trees). It is also helpful to remember that the ground acts like a sponge to absorb rainwater. Make sure you have as much open area (as opposed to cement, asphalt, or other ground cover that won't absorb water) so that your land can act as a filter for the ecosystem.

For more details on how you use your property and ways to protect water quality and habitat, contact the New Hampshire Department of Environmental Services.

Data Sheet page 1 site:

Activity (circle one): Deployment Monthly Check Collection

Date:

Conditions/Observations/Action Taken:

Time Spent:

Activity (circle one): Deployment Monthly Check Collection

Date:

Conditions/Observations/Action Taken:

Time Spent:

Activity (circle one): Deployment Monthly Check Collection

Date:

Conditions/Observations/Action Taken:

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Activity (circle one): Deployment Monthly Check Collection

Date:

Conditions/Observations/Action Taken:

Time Spent:

Activity (circle one): Deployment Monthly Check Collection

Date:

Conditions/Observations/Action Taken:

Time Spent:

T r o u b l e s h o o t i n g

What if I am not going to be home during deployment, collection or monthly maintenance? Call AERC to see if someone can visit your site and take care of it for you in your absence. It is important to avoid asking an untrained volunteer to take your place, since the shellfish are extremely fragile.

My site is too shallow for the collector. If you have two bags on the site, you may be able to remove one, and still have a working site. Also check if there is a place you can move the rope where the water is deeper. Consider asking a neighbor if they would like to partner with you on the project. Always remember to contact AERC staff if you are making changes to the site mid-season.

During my monthly check I noticed that part of the collector is missing or broken. Let AERC know as soon as possible. We will either come out and see if there is a way to fix it, or talk you through it over the phone. This is not uncommon. The water is strong and lots of things can go wrong. This is why it is so important to do monthly checks.

Help! The collector is gone! We have some difficulty with strong currents, the action of ice on the line, and other problems that arise which can destroy a collector. Let AERC know as soon as you discover it missing so that we can either replace it, or close the site for the season. Each collector buoy is numbered and has our contact information on it. In the best of luck someone may find it and call in where it landed for our records. We may have to make modifications to how we deploy for the next season.

Use this space to record troubleshooting issues at your site as they arise:

Other Shellfish Programs

Information on oyster gardening (Chesapeake Bay Foundation site):
http://www.cbf.org/action/outdoors/oysters.htm
Giving scallops a helping hand (feature article reprinted from Commercial Fishing News)
http://www.fishresearch.org/Articles/2001/09/Scallop_Spat.asp
Criteria for growout site selection (interview notes from a mollucan aquaculture technician) :
http://www.k12.nf.ca/kingacademy/grassroots/Interview.html
New Haven Oysters
http://www.qrwa.org/Education/New_Haven_Oysters.html
Economic Benefits of Connecticut 's Oyster Farming Industry
http://www.state.ct.us/doag/business/aquac/oysecono.htm
Horn Point Laboratory (MD) Oyster Hatchery
http://www.hpl.umces.edu/facilities/oysters.html
Franklin Institute's Online Oyster Page
http://sln.fi.edu/fellows/fellow7/dec98/oysters/

Canadian Web sites:
Underwater World
http://www.dfo-mpo.gc.ca/zone/underwater_sous-marin/oyster/oyster.htm
American Oysters
http://www.naia.nf.net/oysters.html
Nova Scotia Department of Agriculture Species Sheets
http://www.gov.ns.ca/nsaf/aquaculture/species/index.htm

Search Words for Internet Exploration:
shellfish restoration
aquaculture
oyster gardening
shellfish spat collection
shellfish larval settlement

P o s t - T r a i n i n g E v a l u a t i o n

Please answer the following brief questions:

1. What did you learn from this training session?

2. Do you think that you can make a difference in the quality of the natural environment around your home? If so, how?

3. What do you think you might do differently at your home based on what you learned today?

T r a i n i n g G u i d e

Session Leader:
Date:
Check off each item as it is completed.

- Welcome and introduction to AERC and the SS program.
- Orientation of ARO building and tour. (May be done as they arrive.)
- Circulate attendee sign-in sheet. File in AERC records after session.
- Hand out SS Training Manuals
- Ask them to fill out the Pre-Training Evaluation before you begin. Ask them to remove it from their manuals and turn it in. This simply gives us an idea of how much they learn from the day's activities by giving a baseline of what they understand about their actions and the environment.
- Go around the group and have each Steward introduce themselves, and describe their site.
- Ask Stewards to put a map marker pin on their site, to add their site to the master site map on the wall at AERC (choose a new color pin to differentiate from existing sites). Also ask them to place an X on the photocopied maps to add their site to the AERC stewards site file.
- Discuss the background to the project. Include how AERC decided to start the program, what other projects it is modeled after, and who supports the program (include funders and other stewards).
- Build a collector. Discuss the parts that make up the collector, what they do, and possible troubleshooting issues that may arise during deployment and over the course of the season.
- Determine which sites will deploy collectors for oysters, scallops or both. Also decide how many bags per collector based on the depth of each site at lowest low tide.
- Timing of deployment. Make plans for contacting each Steward to initiate deployment during the year. Determine who will test the site with a scheduled plankton tow, and it's timing.
- Monthly collector maintenance. Review maintenance sheet in manual.

- Collection Methods. Explain the way to collect the spat bags, what we are looking for, and whether they will be bringing them to AERC for spat counts and identification of contents. Include how best to transport live samples to the facility.

- Reseeding Plan. Discuss current strategy for placing shellfish spat in local waters.

- Question and answer period.

- Guest speaker. Suggested guest speakers include DES shellfish program, NHEP, OSP, Fish and Game, Chesapeake Bay Oyster Gardeners, other related programs in the east, shellfish advisors.

- Ask Stewards to answer post-training evaluation. Ask them to remove the page from their manual and turn it in for our records.

- Thank everyone for attending. Make sure each new Steward receives their thank you mug.

Comments on training session: